Name:_____

Test Your Skills - 05
Deadline - 3/17

Answer these exercises, in complete mathematical sentences and using mathematical notation properly. You are to work on these individually, without collaboration. You may consult your book and myself, but **not the math lab** or other resources. To earn extra credit, stop into my office hours (or make an appointment) and present your solutions. Partial credit will be given for any earnest attempt.

Exercise 1. *Suppose that* $\vec{a} \neq 0$.

(a) If $\vec{a} \bullet \vec{b} = \vec{a} \bullet \vec{c}$*, then must it be the case that* $\vec{b} = \vec{c}$*?*

(b) If $\vec{a} \times \vec{b} = \vec{a} \times \vec{c}$*, then must it be the case that* $\vec{b} = \vec{c}$*?*

(c) If $\vec{a} \bullet \vec{b} = \vec{a} \bullet \vec{c}$ *and* $\vec{a} \times \vec{b} = \vec{a} \times \vec{c}$*, then must it be the case that* $\vec{b} = \vec{c}$*?*

Exercise 2. *Find equations of the planes parallel to the plane defined by* $x + 2y - 2z = 1$*, and two units away from it.*

Exercise 3. *Describe, with an equation, the surface upon which the curve described by the vector valued function* $\vec{r}(t) =< t\cos(t), t\sin(t), t >$ *lies.*

Exercise 4. *If* $\vec{r}(t)$ *is a vector valued function such that* $\vec{r}\,'(t)$ *and* $\vec{r}\,''(t)$ *exist, show that*

$$\frac{d}{dt}\left[\vec{r}(t) \times \vec{r}\,'\right] = \vec{r} \times \vec{r}\,''(t).$$